

SEQUENCE LISTING

<110> Covacci, Antonello
Bugnoli, Massimo
Telford, John
Macchia, Giovanni
Rappuoli, Rino

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<151> 1995-06-06

<150> 08/256,848

<151> 1994-10-21

<150> 09/410,835

<151> 1999-10-01

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<170> PatentIn version 3.2

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 Ile Asn Pro Pro Asn Ser Ala Gln Lys Thr Glu Val Gln Pro Thr Gln
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Asn Asn Pro Asp Asn Tyr Lys Tyr Leu Ile Gly Lys Ala Trp Lys Asn
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Ala Lys Glu Val Phe Leu Asn Leu Gly Val Val Tyr Leu His Asn
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| gtagagcaag | cgtaggccga | tctcaaaaat | ttctcaaagg | agcaattggc | ccaacaagct | 3000 |
| caaaaaaatg | aaagtctcaa | tgctagaaaa | aaatctgaaa | tatatcaatc | cgtaagaat | 3060 |
| ggtgtgaatg | gaaccctagt | cggtaatggg | ttatctcaag | cagaagccac | aactctttct | 3120 |
| aaaaactttt | cggacatcaa | gaaagagttg | aatgcaaaac | ttggaaattt | caataacaat | 3180 |
| aacaataatg | gactcaaaaa | cgaaccctatt | tatgctaaag | ttaataaaaa | gaaagcaggg | 3240 |
| caagcagcta | gccttgaaag | acccattttac | gctcaagttg | ctaaaaaggt | aaatgcaaaa | 3300 |
| attgaccgac | tcaatcaaat | agcaagtggg | ttgggtgttg | tagggcaagc | agcgggcttc | 3360 |
| cctttgaaaa | ggcatgataa | agttgatgat | ctcagtaagg | tagggctttc | aaggaatcaa | 3420 |
| gaattggctc | agaaaattga | caatctcaat | caagcgggat | cagaagctaa | agcaggtttt | 3480 |
| tttggcaatc | tagagcaaac | gatagacaag | ctcaaagatt | ctacaaaaca | caatcccatg | 3540 |

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|------|
| aatctatggg | ttgaaagtgc | aaaaaaagta | cctgctagtt | tgtcagcgaa | actagacaat | 3600 |
| tacgctacta | acagccacat | acgcattaat | agcaatatca | aaaatggagc | aatcaatgaa | 3660 |
| aaagcgaccg | gcatgctaac | gcaaaaaaac | cctgagtggc | tcaagctcgt | gaatgataag | 3720 |
| atagttgcgc | ataatgtagg | aagcgttcct | ttgtcagagt | atgataaaat | tggcttcaac | 3780 |
| cagaagaata | tgaagatta | ttctgattcg | ttcaagtttt | ccaccaagtt | gaacaatgct | 3840 |
| gtaaaagaca | ctaattctgg | ctttacgcaa | tttttaacca | atgcattttc | tacagcatct | 3900 |
| tattactgct | tggcgagaga | aaatgcggag | catggaatca | agaacgttaa | tacaaaaggt | 3960 |
| ggtttccaaa | aatctttaaag | gattaaggaa | taccaaaaaac | gcaaaaacca | ccccttgcta | 4020 |
| aaagcgaggg | gttttttaat | actccttagc | agaaatccca | atcgtcttta | gtattttggga | 4080 |
| tgaatgctac | caattcatgg | tatcatatcc | ccatacattc | gtatctagcg | taggaagtgt | 4140 |
| gcaaagttac | gcctttggag | atatgatgtg | tgagacctgt | agggaatgcg | ttggagctca | 4200 |
| aactctgtaa | aatccctatt | atagggacac | agagtggaaa | ccaaactctc | cctacgggca | 4260 |
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| gacagacact | aacgaaaggc | tttgttcttt | aaagtctgca | tggatatttc | ctaccccaaa | 4380 |
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| cgaaaattaa | ttaaggggta | taaagagagc | ataaactaga | aaaaacaagt | agctataaca | 4500 |
| aagatcaagt | tcaaaaaatc | atagagcttt | tagagcaaat | tgatcgcgct | cttaacccaa | 4560 |
| gaaaaatcag | aaaaaccata | ggaattatca | caccttataa | tgcccaaaaa | agacgcttgc | 4620 |
| gatcagaagt | ggaaaaatac | ggcttcaaga | attttgatga | gctcaaaata | gacactgtgg | 4680 |
| atgcctttca | aggtgaagag | gcagatatta | ttattttattc | caccgtgaaa | acttgtggta | 4740 |
| atctttcttt | cttgctagat | tctaaacgct | tgaatgtggc | tatttctagg | gcaaaagaaa | 4800 |
| atctcatttt | tgtgggtaaa | aagtctttct | ttgagaattt | atgaagcgat | gagaagaata | 4860 |
| tcttttagcgc | tattttgcaa | gtctgtagat | aggtaatctt | ttccaaagat | aatcattaga | 4920 |
| cattcttcgc | ttcaaaacgc | tttcataaat | ctctctaaag | cgctttataa | tcaacacaat | 4980 |
| acccttatag | tgtgagctat | agcccccttt | tgggaattga | gttattttga | ctttaaattt | 5040 |
| ttattagcgt | tacaatttga | gccattcttt | agcttggttt | tctagccaga | tcacatcgcc | 5100 |
| gctcgcatga | aattccactt | tagggaatgc | gtgtgcattt | tttttaaggg | cgtatttttg | 5160 |
| ctgcaaatat | cctacaatag | catcgcccg | atggatgagt | aggggggggtg | ttgaaagggc | 5220 |
| aaaatgctcc | ataaaatagc | cctcaatttt | ttgagcgatt | aagggaatat | gcgtgcaacc | 5280 |
| taaaataatc | acttcgggaa | aatctttaaag | ggagtgaat | aataacgcat | gcaagtttct | 5340 |
| aacaattcgc | cctctaaaat | actttcttca | atcaaaggca | caaaaagaga | agtggctaaa | 5400 |
| tgcgaaacat | tcaaatagcc | ttgttggttc | agggcattgt | cataagcggt | ggattggatc | 5460 |
| gtcgcttttg | tccctagcac | taaaataggg | gcgtttttat | cttttacttg | tcgcttgatc | 5520 |
| gctaaaatgc | ttggctcaat | cacgcccaca | atagggattt | tggaatgctt | ttgcatctct | 5580 |
| tctaaagcta | gagcgctcgc | tgtgttgcat | gccacaatca | ataattcaat | ctggtgcggg | 5640 |
| ttgaaaaaat | ccaagcctc | taagccaaat | tgcttgatcg | tagtgggggtc | tttagtgcca | 5700 |

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aggcttttta aaacgctaaa ccctcccaca ccgctatcaa aaacgcctat tttcatgaca 5820
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<211> 1147
<212> PRT
<213> *Helicobacter pylori*

<400> 5

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Asn Pro Gln Gln Phe Ile Asn Asn Leu Gln Val Ala Phe Leu Lys Val
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Asp Asn Ala Val Ala Ser Tyr Asp Pro Asp Gln Lys Pro Ile Val Asp
35 40 45

Lys Asn Asp Arg Asp Asn Arg Gln Ala Phe Glu Gly Ile Ser Gln Leu
50 55 60

Arg Glu Glu Tyr Ser Asn Lys Ala Ile Lys Asn Pro Thr Lys Lys Asn
65 70 75 80

Gln Tyr Phe Ser Asp Phe Ile Asn Lys Ser Asn Asp Leu Ile Asn Lys
85 90 95

Asp Asn Leu Ile Asp Val Glu Ser Ser Thr Lys Ser Phe Gln Lys Phe
100 105 110

Gly Asp Gln Arg Tyr Arg Ile Phe Thr Ser Trp Val Ser His Gln Asn
115 120 125

Asp Pro Ser Lys Ile Asn Thr Arg Ser Ile Arg Asn Phe Met Glu Asn
130 135 140

Ile Ile Gln Pro Pro Ile Leu Asp Asp Lys Glu Lys Ala Glu Phe Leu
145 150 155 160

Lys Ser Ala Lys Gln Ser Phe Ala Gly Ile Ile Ile Gly Asn Gln Ile
165 170 175

Arg Thr Asp Gln Lys Phe Met Gly Val Phe Asp Glu Ser Leu Lys Glu
180 185 190

Arg Gln Glu Ala Glu Lys Asn Gly Glu Pro Thr Gly Gly Asp Trp Leu
195 200 205

Asp Ile Phe Leu Ser Phe Ile Phe Asp Lys Lys Gln Ser Ser Asp Val
210 215 220

Lys Glu Ala Ile Asn Gln Glu Pro Val Pro His Val Gln Pro Asp Ile
 225 230 235 240
 Ala Thr Thr Thr Thr Asp Ile Gln Gly Leu Pro Pro Glu Ala Arg Asp
 245 250 255
 Leu Leu Asp Glu Arg Gly Asn Phe Ser Lys Phe Thr Leu Gly Asp Met
 260 265 270
 Glu Met Leu Asp Val Glu Gly Val Ala Asp Ile Asp Pro Asn Tyr Lys
 275 280 285
 Phe Asn Gln Leu Leu Ile His Asn Asn Ala Leu Ser Ser Val Leu Met
 290 295 300
 Gly Ser His Asn Gly Ile Glu Pro Glu Lys Val Ser Leu Leu Tyr Gly
 305 310 315 320
 Gly Asn Gly Gly Pro Gly Ala Arg His Asp Trp Asn Ala Thr Val Gly
 325 330 335
 Tyr Lys Asp Gln Gln Gly Asn Asn Val Ala Thr Ile Ile Asn Val His
 340 345 350
 Met Lys Asn Gly Ser Gly Leu Val Ile Ala Gly Gly Glu Lys Gly Ile
 355 360 365
 Asn Asn Pro Ser Phe Tyr Leu Tyr Lys Glu Asp Gln Leu Thr Gly Ser
 370 375 380
 Gln Arg Ala Leu Ser Gln Glu Glu Ile Gln Asn Lys Ile Asp Phe Met
 385 390 395 400
 Glu Phe Leu Ala Gln Asn Asn Ala Lys Leu Asp Asn Leu Ser Glu Lys
 405 410 415
 Glu Lys Glu Lys Phe Arg Thr Glu Ile Lys Asp Phe Gln Lys Asp Ser
 420 425 430
 Lys Ala Tyr Leu Asp Ala Leu Gly Asn Asp Arg Ile Ala Phe Val Ser
 435 440 445
 Lys Lys Asp Thr Lys His Ser Ala Leu Ile Thr Glu Phe Gly Asn Gly
 450 455 460
 Asp Leu Ser Tyr Thr Leu Lys Asp Tyr Gly Lys Lys Ala Asp Lys Ala
 465 470 475 480
 Leu Asp Arg Glu Lys Asn Val Thr Leu Gln Gly Ser Leu Lys His Asp
 485 490 495
 Gly Val Met Phe Val Asp Tyr Ser Asn Phe Lys Tyr Thr Asn Ala Ser

| 500 | | | | | 505 | | | | | 510 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Asn | Pro | Asn | Lys | Gly | Val | Gly | Val | Thr | Asn | Gly | Val | Ser | His | Leu |
| | 515 | | | | | | 520 | | | | | 525 | | | |
| Glu | Val | Gly | Phe | Asn | Lys | Val | Ala | Ile | Phe | Asn | Leu | Pro | Asp | Leu | Asn |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Asn | Leu | Ala | Ile | Thr | Ser | Phe | Val | Arg | Arg | Asn | Leu | Glu | Asp | Lys | Leu |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Thr | Thr | Lys | Gly | Leu | Ser | Pro | Gln | Glu | Ala | Asn | Lys | Leu | Ile | Lys | Asp |
| | | | 565 | | | | | | 570 | | | | | 575 | |
| Phe | Leu | Ser | Ser | Asn | Lys | Glu | Leu | Val | Gly | Lys | Thr | Leu | Asn | Phe | Asn |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Lys | Ala | Val | Ala | Asp | Ala | Lys | Asn | Thr | Gly | Asn | Tyr | Asp | Glu | Val | Lys |
| | 595 | | | | | | 600 | | | | | 605 | | | |
| Lys | Ala | Gln | Lys | Asp | Leu | Glu | Lys | Ser | Leu | Arg | Lys | Arg | Glu | His | Leu |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Glu | Lys | Glu | Val | Glu | Lys | Lys | Leu | Glu | Ser | Lys | Ser | Gly | Asn | Lys | Asn |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Lys | Met | Glu | Ala | Lys | Ala | Gln | Ala | Asn | Ser | Gln | Lys | Asp | Glu | Ile | Phe |
| | | | | 645 | | | | | 650 | | | | | 655 | |
| Ala | Leu | Ile | Asn | Lys | Glu | Ala | Asn | Arg | Asp | Ala | Arg | Ala | Ile | Ala | Tyr |
| | | | 660 | | | | | 665 | | | | | 670 | | |
| Ala | Gln | Asn | Leu | Lys | Gly | Ile | Lys | Arg | Glu | Leu | Ser | Asp | Lys | Leu | Glu |
| | 675 | | | | | | 680 | | | | | 685 | | | |
| Asn | Val | Asn | Lys | Asn | Leu | Lys | Asp | Phe | Asp | Lys | Ser | Phe | Asp | Glu | Phe |
| | 690 | | | | | 695 | | | | | 700 | | | | |
| Lys | Asn | Gly | Lys | Asn | Lys | Asp | Phe | Ser | Lys | Ala | Glu | Glu | Thr | Leu | Lys |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 |
| Ala | Leu | Lys | Gly | Ser | Val | Lys | Asp | Leu | Gly | Ile | Asn | Pro | Glu | Trp | Ile |
| | | | | 725 | | | | | 730 | | | | | 735 | |
| Ser | Lys | Val | Glu | Asn | Leu | Asn | Ala | Ala | Leu | Asn | Glu | Phe | Lys | Asn | Gly |
| | | | 740 | | | | | 745 | | | | | 750 | | |
| Lys | Asn | Lys | Asp | Phe | Ser | Lys | Val | Thr | Gln | Ala | Lys | Ser | Asp | Leu | Glu |
| | 755 | | | | | | 760 | | | | | 765 | | | |
| Asn | Ser | Val | Lys | Asp | Val | Ile | Ile | Asn | Gln | Lys | Val | Thr | Asp | Lys | Val |
| | 770 | | | | | 775 | | | | | 780 | | | | |

Asp Asn Leu Asn Gln Ala Val Ser Val Ala Lys Ala Thr Gly Asp Phe
 785 790 795 800
 Ser Arg Val Glu Gln Ala Leu Ala Asp Leu Lys Asn Phe Ser Lys Glu
 805 810 815
 Gln Leu Ala Gln Gln Ala Gln Lys Asn Glu Ser Leu Asn Ala Arg Lys
 820 825 830
 Lys Ser Glu Ile Tyr Gln Ser Val Lys Asn Gly Val Asn Gly Thr Leu
 835 840 845
 Val Gly Asn Gly Leu Ser Gln Ala Glu Ala Thr Thr Leu Ser Lys Asn
 850 855 860
 Phe Ser Asp Ile Lys Lys Glu Leu Asn Ala Lys Leu Gly Asn Phe Asn
 865 870 875 880
 Asn Asn Asn Asn Asn Gly Leu Lys Asn Glu Pro Ile Tyr Ala Lys Val
 885 890 895
 Asn Lys Lys Lys Ala Gly Gln Ala Ala Ser Leu Glu Glu Pro Ile Tyr
 900 905 910
 Ala Gln Val Ala Lys Lys Val Asn Ala Lys Ile Asp Arg Leu Asn Gln
 915 920 925
 Ile Ala Ser Gly Leu Gly Val Val Gly Gln Ala Ala Gly Phe Pro Leu
 930 935 940
 Lys Arg His Asp Lys Val Asp Asp Leu Ser Lys Val Gly Leu Ser Arg
 945 950 955 960
 Asn Gln Glu Leu Ala Gln Lys Ile Asp Asn Leu Asn Gln Ala Val Ser
 965 970 975
 Glu Ala Lys Ala Gly Phe Phe Gly Asn Leu Glu Gln Thr Ile Asp Lys
 980 985 990
 Leu Lys Asp Ser Thr Lys His Asn Pro Met Asn Leu Trp Val Glu Ser
 995 1000 1005
 Ala Lys Lys Val Pro Ala Ser Leu Ser Ala Lys Leu Asp Asn Tyr
 1010 1015 1020
 Ala Thr Asn Ser His Ile Arg Ile Asn Ser Asn Ile Lys Asn Gly
 1025 1030 1035
 Ala Ile Asn Glu Lys Ala Thr Gly Met Leu Thr Gln Lys Asn Pro
 1040 1045 1050
 Glu Trp Leu Lys Leu Val Asn Asp Lys Ile Val Ala His Asn Val
 1055 1060 1065

Gly Ser Val Pro Leu Ser Glu Tyr Asp Lys Ile Gly Phe Asn Gln
 1070 1075 1080

Lys Asn Met Lys Asp Tyr Ser Asp Ser Phe Lys Phe Ser Thr Lys
 1085 1090 1095

Leu Asn Asn Ala Val Lys Asp Thr Asn Ser Gly Phe Thr Gln Phe
 1100 1105 1110

Leu Thr Asn Ala Phe Ser Thr Ala Ser Tyr Tyr Cys Leu Ala Arg
 1115 1120 1125

Glu Asn Ala Glu His Gly Ile Lys Asn Val Asn Thr Lys Gly Gly
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Phe Gln Lys Ser
 1145

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 <211> 546
 <212> PRT
 <213> Helicobacter pylori

<400> 6

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Arg Gly Arg Asn Val Leu Ile Gln Lys Ser Tyr Gly Ala Pro Ser Ile
 35 40 45

Thr Lys Asp Gly Val Ser Val Ala Lys Glu Ile Glu Leu Ser Cys Pro
 50 55 60

Val Ala Asn Met Gly Ala Gln Leu Val Lys Glu Val Ala Ser Lys Thr
 65 70 75 80

Ala Asp Ala Ala Gly Asp Gly Thr Thr Thr Ala Thr Val Leu Ala Tyr
 85 90 95

Ser Ile Phe Lys Glu Gly Leu Arg Asn Ile Thr Ala Gly Ala Asn Pro
 100 105 110

Ile Glu Val Lys Arg Gly Met Asp Lys Ala Ala Glu Ala Ile Ile Asn
 115 120 125

Glu Leu Lys Lys Ala Ser Lys Lys Val Gly Gly Lys Glu Glu Ile Thr
 130 135 140

Gln Val Ala Thr Ile Ser Ala Asn Ser Asp His Asn Ile Gly Lys Leu
 145 150 155 160

Ile Ala Asp Ala Met Glu Lys Val Gly Lys Asp Gly Val Ile Thr Val
 165 170 175

Glu Glu Ala Lys Gly Ile Glu Asp Glu Leu Asp Val Val Glu Gly Met
 180 185 190

Gln Phe Asp Arg Gly Tyr Leu Ser Pro Tyr Phe Val Thr Asn Ala Glu
 195 200 205

Lys Met Thr Ala Gln Leu Asp Asn Ala Tyr Ile Leu Leu Thr Asp Lys
 210 215 220

Lys Ile Ser Ser Met Lys Asp Ile Leu Pro Leu Leu Glu Lys Thr Met
 225 230 235 240

Lys Glu Gly Lys Pro Leu Leu Ile Ile Ala Glu Asp Ile Glu Gly Glu
 245 250 255

Ala Leu Thr Thr Leu Val Val Asn Lys Leu Arg Gly Val Leu Asn Ile
 260 265 270

Ala Ala Val Lys Ala Pro Gly Phe Gly Asp Arg Arg Lys Glu Met Leu
 275 280 285

Lys Asp Ile Ala Ile Leu Thr Gly Gly Gln Val Ile Ser Glu Glu Leu
 290 295 300

Gly Leu Ser Leu Glu Asn Ala Glu Val Glu Phe Leu Gly Lys Ala Gly
 305 310 315 320

Arg Ile Val Ile Asp Lys Asp Asn Thr Thr Ile Val Asp Gly Lys Gly
 325 330 335

His Ser Asp Asp Val Lys Asp Arg Val Ala Gln Ile Lys Thr Gln Ile
 340 345 350

Ala Ser Thr Thr Ser Asp Tyr Asp Lys Glu Lys Leu Gln Glu Arg Leu
 355 360 365

Ala Lys Leu Ser Gly Gly Val Ala Val Ile Lys Val Gly Ala Ala Ser
 370 375 380

Glu Val Glu Met Lys Glu Lys Lys Asp Arg Val Asp Asp Ala Leu Ser
 385 390 395 400

Ala Thr Lys Ala Ala Val Glu Glu Gly Ile Val Ile Gly Gly Gly Ala
 405 410 415

Ala Leu Ile Arg Ala Ala Gln Lys Val His Leu Asn Leu His Asp Asp
 420 425 430

Glu Lys Val Gly Tyr Glu Ile Ile Met Arg Ala Ile Lys Ala Pro Leu
 435 440 445

Ala Gln Ile Ala Ile Asn Ala Gly Tyr Asp Gly Gly Val Val Val Asn
 450 455 460

Glu Val Glu Lys His Glu Gly His Phe Gly Phe Asn Ala Ser Asn Gly
 465 470 475 480

Lys Tyr Val Asp Met Phe Lys Glu Gly Ile Ile Asp Pro Leu Lys Val
 485 490 495

Glu Arg Ile Ala Leu Gln Asn Ala Val Ser Val Ser Ser Leu Leu Leu
 500 505 510

Thr Thr Glu Ala Thr Val His Glu Ile Lys Glu Glu Lys Ala Thr Pro
 515 520 525

Ala Met Pro Asp Met Gly Gly Met Gly Gly Met Gly Gly Met Gly Gly
 530 535 540

Met Met
 545

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 <211> 1838
 <212> DNA
 <213> Helicobacter pylori

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 ctccatgacg ctgtcaaagt aaccatgggg ccaagaggca ggaatgtatt gatccaaaaa 180
 agctatggcg ctccaagcat caccaaagac ggcgtgagcg tggctaaaga gattgaatta 240
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 gatgtgccc gcgatggcac gaccacagcg accgtgctag cttatagcat ttttaaagaa 360
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 acggataaaa aaatctctag catgaaagac attctccgc tactagaaaa aaccatgaaa 780
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 aaagaagaaa aagcgactcc ggcaatgcct gatatgggtg gcatgggcgg tatgggagggc 1680
 atgggcggca tgatgtaagc ccgcttgctt tttagtataa tctgctttta aaatcccttc 1740
 tctaaatccc cccctttcta aaatctcttt tttggggggg tgctttgata aaaccgctcg 1800
 cttgtaaaaa catgcaacaa aaaatctctg ttaagctt 1838

<210> 8
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer oligonucleotide

<400> 8
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<210> 9
 <211> 12
 <212> PRT
 <213> Helicobacter pylori

<400> 9

Glu Phe Lys Asn Gly Lys Asn Lys Asp Phe Ser Lys
 1 5 10

<210> 10
 <211> 5
 <212> PRT
 <213> Helicobacter pylori

<400> 10

Glu Pro Ile Tyr Ala
 1 5

<210> 11
 <211> 102
 <212> DNA
 <213> Helicobacter pylori

<400> 11
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ccctttgaaa ggcatgataa agttgatgat ctgagtaagg ta 102

<210> 12
<211> 34
<212> PRT
<213> Helicobacter pylori

<400> 12

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Gly Gly Pro Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp Leu Ser
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Lys Val

<210> 13
<211> 18
<212> DNA
<213> Helicobacter pylori

<400> 13
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<210> 14
<211> 6
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<400> 14

Pro Glu Pro Ile Tyr Ala
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<210> 15
<211> 9
<212> DNA
<213> Helicobacter pylori

<400> 15
gatgatctc

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<210> 16
<211> 3
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<400> 16

Asp Asp Leu
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<210> 17
<211> 15
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<213> Helicobacter pylori

<400> 17

Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp Leu Ser Lys Val
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<210> 18
 <211> 45
 <212> DNA
 <213> Helicobacter pylori

 <400> 18
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 <210> 19
 <211> 36
 <212> DNA
 <213> Helicobacter pylori

 <400> 19
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 <210> 20
 <211> 15
 <212> DNA
 <213> Helicobacter pylori

 <400> 20
 gaacccattt atgct 15

 <210> 21
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 <212> DNA
 <213> Helicobacter pylori

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 gaacccattt acgct 15

 <210> 22
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 <212> DNA
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 <400> 22
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 <210> 23
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 <212> PRT
 <213> Helicobacter pylori

 <400> 23
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 <210> 24
 <211> 18
 <212> DNA
 <213> Helicobacter pylori

 <400> 24
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